2008 Regional Space Grant Consortium Conference Schedules

Northeastern Regional
September 4-6th, 2008
West Hartford, CT

Mid-Atlantic Regional
September 7-10th, 2008
Baltimore, MD

Western Regional
September 25-27th, 2008
Jackson Hole, WY

Southeastern Regional
January 2009
Puerto Rico

Great Midwestern Regional
October 28, 2008
Atlanta, GA

2008 ESMD Space Grant Faculty Project

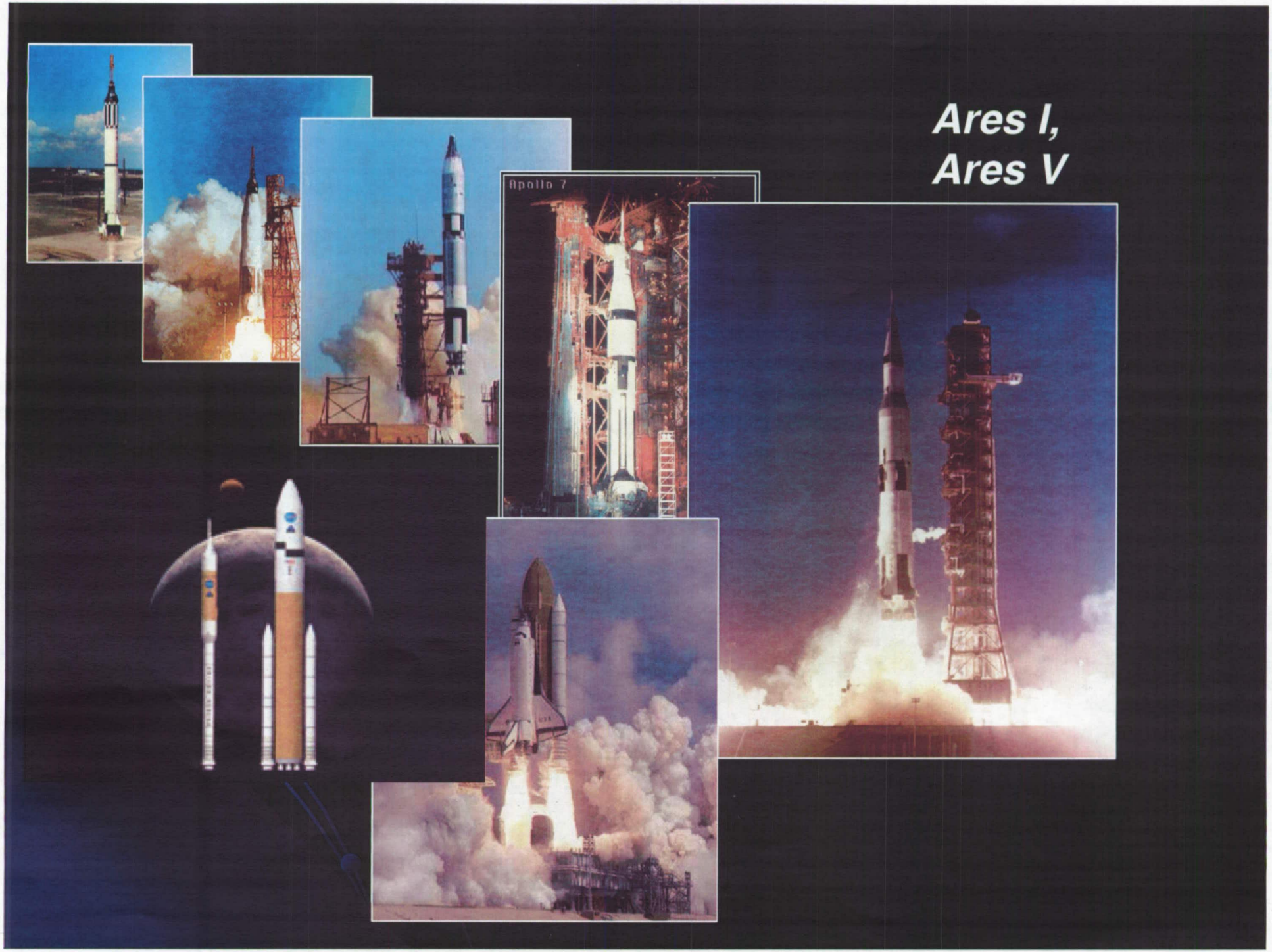
Faculty Assignments

Dr. James Conrad, Univ. of North Carolina - Charlotte (JSC)
Dr. Jiang Guo, California State University Los Angeles (ARC)
Dr. Ellen Lackey, University of Mississippi (KSC)
Dr. Jonathan Lambright, Savannah State University (SSC)
Dr. Prabhakar Misra, Howard University (GSFC)
Dr. Nadipuram Prasad, New Mexico State University (JPL)
Dr. Roger Radcliff, Ohio University (GRC)
Dr. Gregory Selby, Old Dominion University (LaRC)
Dr. Jean-Marie Wersinger, Auburn University (MSFC)
Dr. Stephen Whitmore, Utah State University (DFRC)

Project Implementation
Gloria Murphy, ESMD SG Faculty Project Manager (KSC)

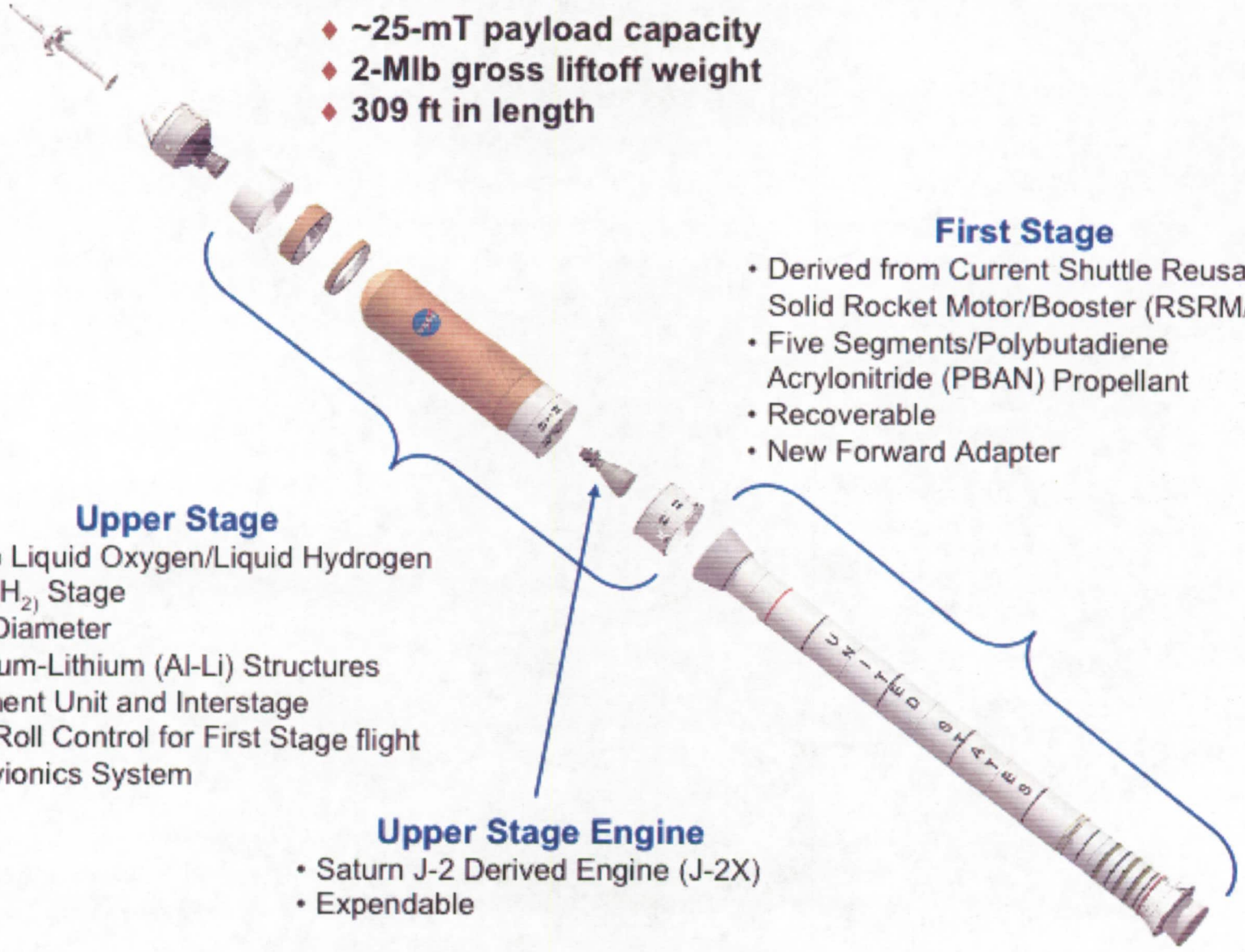
Objectives

- Gather senior design project ideas and internship opportunities:
  - Relative to space exploration
  - In support of the ESMD Space Grant Student Project
- Support NASA's Educational Framework
  - Outcome 1: Contribute to the development of the STEM workforce


Apollo 7
Ares I,
Ares V

Ares I Crew Launch Vehicle

- ~25-mT payload capacity
- 2-Mlb gross liftoff weight
- 309 ft in length



First Stage

- Derived from Current Shuttle Reusable Solid Rocket Motor/Booster (RSRM/B)
- Five Segments/Polybutadiene Acrylonitride (PBAN) Propellant
- Recoverable
- New Forward Adapter

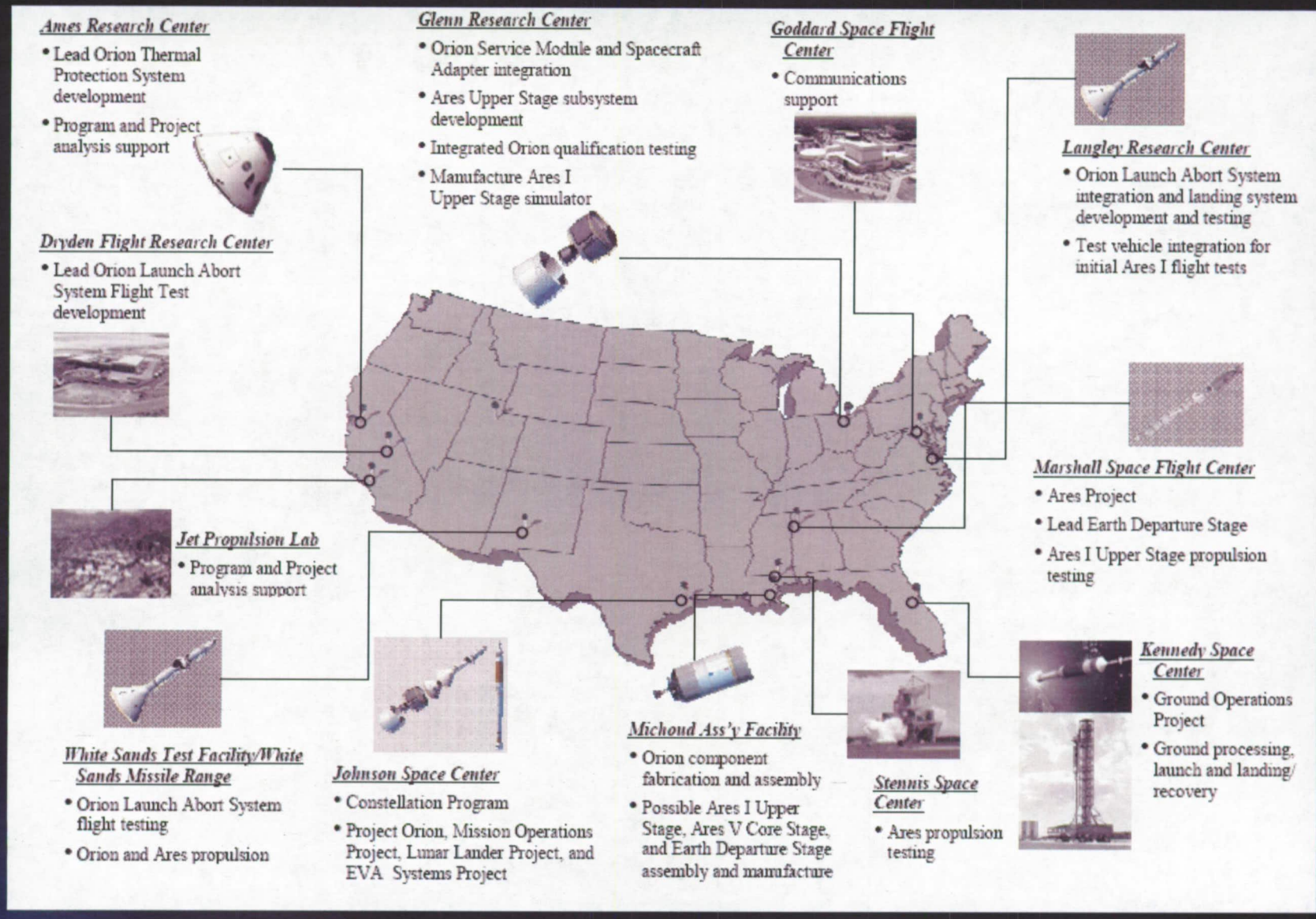
Upper Stage

- 280-klb Liquid Oxygen/Liquid Hydrogen (LOX/LH_{2}) Stage
- 5.5-m Diameter
- Aluminum-Lithium (Al-Li) Structures
- Instrument Unit and Interstage
- RCS / Roll Control for First Stage flight
- CLV Avionics System

Upper Stage Engine

- Saturn J-2 Derived Engine (J-2X)
- Expendable

ESMD Centers



ESMD Project Areas

Spacecraft

Guidance, navigation, and control; Thermal; Electrical; Avionics; Power systems; High-speed reentry; Interoperability/Commonality; Advanced spacecraft materials; Crew/Vehicle health monitoring; Life-support systems; Command/Communication software; Modeling and simulation

Ground Operations

Pre-launch; Launch; Mission operations; Command, control, and communications; Landing and recovery operations

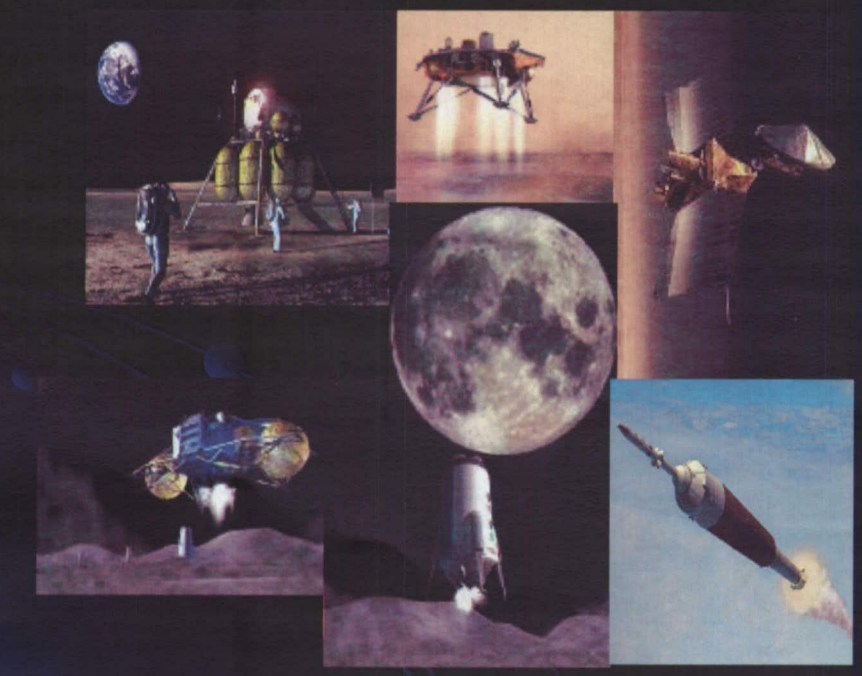
Propulsion

Methods that utilize materials found on the Moon and Mars; On-orbit propellant storage; Methods for soft-landing

Lunar & Planetary Surface Systems

Precision landing software; In-situ resource utilization; Navigation systems; Extended surface operations; Robotics; Environmental sensors and analysis; Radiation protection; Life-support systems; Electrical power and efficient power management systems

Senior Design Projects for ESMD



Allow students the practical design experience of developing technologies and systems for space exploration under the advice, guidance, and mentorship of university faculty, and NASA engineers and scientists.

The projects are aligned with a clear vision for exploration and serve to stretch one's imagination for developing revolutionary technologies needed to explore our solar system and beyond.

Example of a Senior Design Project

One problem with enclosed living spaces is that sometimes surfaces will collect condensation due to a cold surface behind the wall. This water could promote the growth of plant or animal life (mold and bugs!).

Investigate how you can design a "wall system" that will trap any condensation that forms, then evaporate it periodically (e.g. every six hours) actively using very little energy or passively when the adjacent air warms above dewpoint.

ESMD Senior Design Project Example

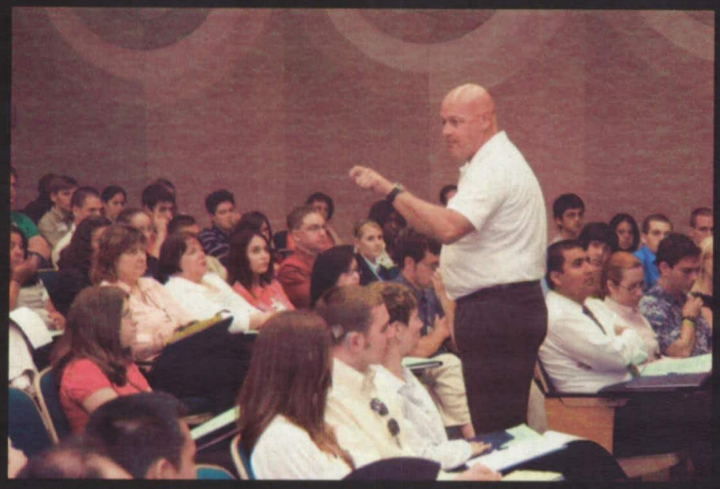
Students insulating their senior design prototype of a loop heat pipe.

Students preparing sounding rockets for launch at competition.

Internships

- Space Grant Consortia fund the interns to work with their mentors for ten weeks.
- Highly qualified students are placed in the mentors' preferred areas.
- Mentors gain a sense of pride that they have contributed to the next generation workforce of NASA and the space industry.
- Students receive unique and invaluable experiences.

Intern Enrichment Activities



Interns receiving a motivational welcome from Joe Dowdy, Special Operations Manager in the Office of the Director at KSC

- NASA speakers
- Tours and demonstrations
- Picnic with mentors

Group activities included viewing the STS-124 landing

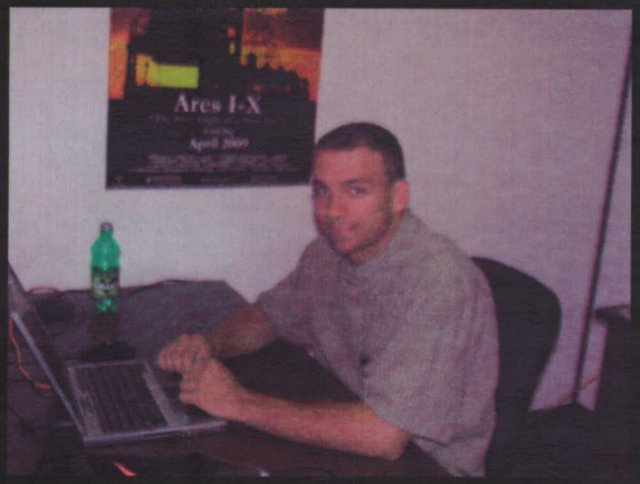
Internship Project Examples

Project Description - Building test bed for lunar simulant and developing a percussive lunar excavator bucket

Samuel – "My mentor emphasizes that what we are working on this summer is useful in a variety of areas in NASA."

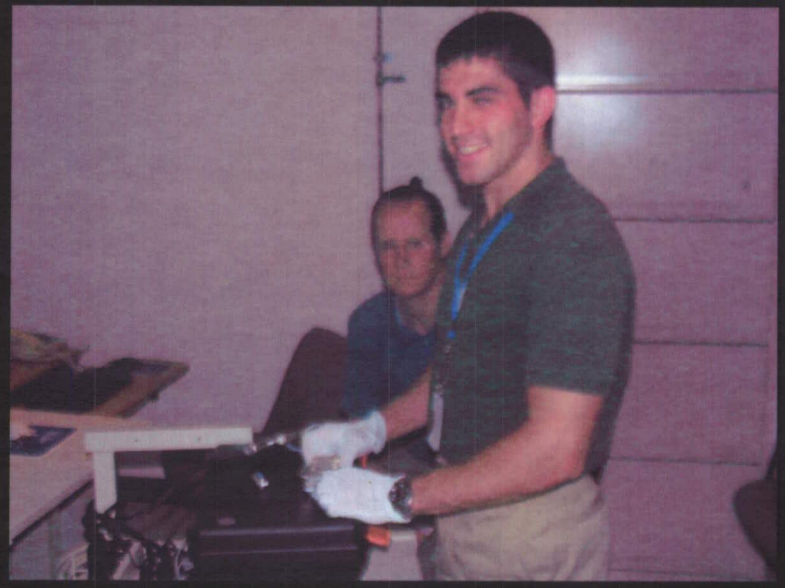
David – "This project has been perfect …people should apply."

Internship Project Examples



One project goal was to improve existing composite materials mechanically and electrically by adding carbon nanotubes to them.

One student is designing and producing a MATLAB® program that seamlessly meshes three different static aerodynamic databases for the Ares I.



Conclusions

The ESMD Space Grant Faculty Project

- Bridges the gap between academia and the NASA vision and mission. Students connect to real world space-related work.
- Exposes students to new and novel approaches to space exploration that better prepare them for future space-related careers.
- Creates greater awareness of current NASA research to new faculty who have never been previously associated with or exposed to the NASA vision and mission.
- Motivates incorporation of space-related curriculum into higher education institutions to increase the education and knowledge base of graduating students.